



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,624	10/25/2001	James G. Shelnut	50455	2203

21874 7590 06/24/2003

EDWARDS & ANGELL, LLP  
P.O. BOX 9169  
BOSTON, MA 02209

EXAMINER

TALBOT, BRIAN K

ART UNIT	PAPER NUMBER
----------	--------------

1762

DATE MAILED: 06/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/057,624

Applicant(s)

SHELNUT, JAMES G.

Examiner

Brian K Talbot

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 11 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 8-26 and 34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 27-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

Art Unit: 1762

1. Applicant's election with traverse of Group I, claims 1-7 and 27-33, in Paper No. 4 is acknowledged. The traversal is on the ground(s) that the Groups are not mutually exclusive. This is not found persuasive because as pointed out in the Restriction, the mode of operation is different where in Group II the metal deposited is performed by applying a current while in Group II the metal is applied without a current. This difference would constitute a serious burden on the Office and therefore, restriction is proper.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 1-34 remain in the application with claims 8-26 and 34 being directed toward non-elected inventions. Hence, claims 1-7 and 27-33 are the only remaining claims presently active in the application.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 28 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 28, the term "the non-conductive layer" lacks antecedent basis.

With respect to claim 33, the term "the apertures" lack antecedent basis.

*Specification*

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The claims are directed toward applying a conductive polymer as a seed layer or to enhance a previously deposited seed layer. The abstract does not recite conductive polymers or even mention seed layers.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

*Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4,6,7,27-30,32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Data et al. (2002/0064592) or Chen (6,277,263) in combination with Rapoport et al. (5,298,687).

Data et al. (2002/0064592) teaches an electroless method of seed layer deposition, repair and fabrication. A dielectric layer (102) having trenches therein is covered with a barrier layer (104). The barrier layer (104) is then covered by a seed layer (105). The seed layer (105) is then covered by an electroless copper deposition layer (106). The layer (106) is provided for the morphology of the seed layer (105) and is referred to as a repairing layer to complete the seed layer for subsequent deposition. Copper (108) is then formed over layer (106) (pg. 2, col. 1, lines [0025] – [0027] and Figs. 1-3)

Chen (6,277,263) teaches method for electrolytically depositing copper on a semiconductor. A copper bath is utilized to electroplate copper onto a seed layer or to enhance an ultra-thin copper seed layer which has been deposited on a barrier layer by PVD. When used for seed layer enhancement, the resulting copper seed layer provides an excellent conformal copper coating that allows the microstructures to be filled with copper layer having good uniformity (see abstract). The substrate can have vias or trenches lined with a barrier layer.

Data et al. (2002/0064592) or Chen (6,277,263) fail to teach the use of a conductive polymer for the seed layer.

Rapoport et al. (5,298,687) teaches a multilayer interconnect system and method of manufacturing. Looking at figs. 1-2, a first metal seed layer (2) is applied to a substrate (1).

Art Unit: 1762

Next a second seed layer (4) is applied to create a continuous seed layer prior to subsequent depositing. The seed layer is a conductive polymer (col. 3, lines 40-62).

Therefore, it would have been obvious for one skilled in the art at the time the invention was made to have modified Data et al. (2002/0064592) or Chen (6,277,263) seed layer with the conductive polymer as evidenced by Rapoport et al. (5,298,687) with the expectation of achieving similar results, i.e. a conformal, continuous conductive coating.

Claims 5 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Data et al. (2002/0064592) or Chen (6,277,263) in combination with either Rapoport et al. (5,298,687) further in view of .

Data et al. (2002/0064592) or Chen (6,277,263) in combination with either Rapoport et al. (5,298,687) fails to teach the conductive polymer being a acetylene, aniline, pyrrole or thiophene.

Features described above are incorporated here.

Jonas et al. (6,358,437 B1) and Cloots et al (6,340,496 B1) both teach utilizing substituted conductive polythiophenes and polypyrroles for forming conductive coatings (abstract).

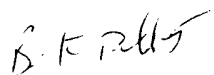
Therefore, it would have been obvious for one skilled in the art at the time the invention was made to have modified Data et al. (2002/0064592) or Chen (6,277,263) in combination with Rapoport et al. (5,298,687) conductive polymer seed layer with Jonas et al. (6,358,437 B1) and Cloots et al (6,340,496 B1) conductive polymers of polythiophenes and polypyrroles with the expectation of achieving similar success.

Art Unit: 1762

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K Talbot whose telephone number is (703) 305-3775. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3775.

  
Brian K Talbot  
Primary Examiner  
Art Unit 1762

BKT  
June 19, 2003